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(54) Name of the Invention: Paper for Signboard

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(71) Patent Assignee: **Oji Yuka Synthetic Paper Co. Ltd.**

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[Note: Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.]

(54) [Name of the Invention]

Paper for Signboard

(57) [Abstract]

[Goal]

The goal of the present invention is to suggest paper used for signboards that allows the pasting of posters without the generation of entrapped air or wrinkles even when done by an amateur.

[Structure]

Paper used for signboards characterized by the fact that it is a paper used for signboards that has a structure formed from a laminated layer sheet (I), which has a structure of supporting material layer (A)/pressure sensitive adhesive agent layer (B)/release paper layer (C), and that allows for printing on the front surface, where the sawing machine (perforated) marks 3 that have a diameter (d) that is within the range of 0.01 ~ 2 mm, a pitch (t) in the range of 2 ~ 10 mm, are perforated at an interval with a width (w) within the range of 50 ~ 200 mm, and the above perforated marks are arranged in the same direction as the elongation (orientation) direction 4, and also, where the above described pressure sensitive adhesive agent layer (B) is a layer that has a peel strength in the range of 10 ~ 200 g/25 mm width.

[Scope of the Claims]

[Claim 1]

Paper used for signboards characterized by the fact that it is a paper used for signboards that has a structure formed from a laminated layer sheet (I), which has a structure of supporting material layer (A)/pressure sensitive adhesive agent layer (B)/release paper layer (C), and that allows for printing on the front surface, where the sawing machine (perforated) marks 3 that have a diameter (d) that is within the range of 0.01 ~ 2 mm, a pitch (t) in the range of 2 ~ 10 mm, are perforated at an interval with a width (w) within the range of 50 ~ 200 mm, and the above perforated marks are arranged in the same

direction as the elongation (orientation) direction 4, and also, where the above described pressure sensitive adhesive agent layer (B) is a layer that has a peel strength in the range of 10 ~ 200 g/25 mm width.

[Claim 2]

Paper used for signboards according to the reported above Claim paragraph 1 characterized by the fact that the supporting material layer (A) has a laminated layer structure formed from a paper-like layer that is obtained from a uniaxially oriented film (A1) of a thermoplastic resin that has multiple fine voids in the inner part and that has fine voids on the surface, and from a biaxially oriented film (A2) of a thermoplastic resin, where the thickness of the above substrate material layer that is comprised of the thermoplastic resin biaxially oriented film (A2) comprises in the range of 10 ~ 60 % of the thickness of the whole material, and also, where the perforated marks are arranged in a direction that is the same as the orientation direction of the paper-like layer.

[Detailed Explanation of the Present Invention]

[0001]

[Technical Field of the Invention]

The present invention is an invention about a paper used for signboards (posters) where at the time of the pasting (gluing) it is difficult to generate entrapped air and the generation of wrinkles is difficult, and because of that specific knowledge and technique is not required, and the pasting can be conducted even by an amateur.

[0002]

[Prior Art]

In the past the baseboards of the signboards erected inside fields like green field areas etc., and the posters that are pasted on boards on the side of the tracks (signboards), have been ones with large dimensions, and not only that but also, the ones that have been photo-printed from handwritten pattern or lettering are also good for imparting images onto the produced products, and because of that a items are used where a large number of large size printed posters where an adhesive layer has been formed on the back side (chrysanthemum stamp, B double stamp, chrysanthemum 4 times stamp, 4/6 stamp, etc.) are connected and by that glued.

[0003]

[Problems Solved by the Present Invention]

However, in the case of such large size printed posters, it is not easy to paste a large number of them on a substrate board continuously and as they are connected so that there

is no generation of entrapped air or wrinkles, and for this pasting a special knowledge and technique is required, and the gluing (pasting) by an amateur is difficult. Also, at the time when at a certain time interval the glued printed posters are removed and new printed posters are glued, at the time when first the glued printed posters are removed, if the removal is not complete (clean), there is a generation of protrusions and indentations (waviness) on the newly pasted printed posters through the adhesive agent layer that has remained on the surface of the substrate board. Consequently, it is necessary that the previously pasted printed poster is completely and cleanly removed from the surface of the substrate board, or that after the removal the remaining adhesive agent layer is dissolved by using a solvent agent, or that together with the remaining adhesive agent layer the surface of the erected signboard is disposed of and that the pasting is performed instead on a new substrate board surface.

[0004]

[Measures in Order to Solve the Problems]

[Essential Elements of the Invention]

The authors of the present invention have collected the results from rigorous studies that have taken into consideration the above described problem points and as a result from that base don the observation that by perforating sawing machine (perforations) on the paper used for the posters in a specific direction, with a specific size, pitch and at a specific distance, it is possible to conduct poster pasting without generation of air entrapment and wrinkles even by an amateur and based on that knowledge the present invention was completed and achieved. Namely, the paper used for signboards according to the present invention is characterized by the fact that it is a paper used for signboards that has a structure formed from a laminated layer sheet (I), which has a structure of supporting material layer (A)/pressure sensitive adhesive agent layer (B)/release paper layer (C), and that allows for printing on the front surface, where the sawing machine (perforated) marks 3 that have a diameter (d) that is within the range of 0.01 ~ 2 mm, a pitch (t) in the range of 2 ~ 10 mm, are perforated at an interval with a width (w) within the range of 50 ~ 200 mm, and the above perforated marks are arranged in the same direction as the elongation (orientation) direction 4, and also, where the above described pressure sensitive adhesive agent layer (B) is a layer that has a peel strength in the range of 10 ~ 200 g/25 mm width.

[0005]

[Detailed Explanation of the Invention]

[I] Signboard Paper

Regarding the signboard paper 1 according to the present invention, as shown according to Figure 1, for example, it has fundamentally a structure that is formed from a laminated layer sheet (I) obtained from a supporting material layer (A), that is comprised of a

thermoplastic resin oriented film, which contains micro voids 2/ a pressure sensitive adhesive agent layer (B)/ a release paper layer (C), where in the part of the above supporting material layer (A)/ pressure sensitive adhesive agent layer (B), as shown according to Figure 2, the perforations 3, which have a diameter (d) that is within the range of 0.01 ~ 2mm, and a pitch (t) that is within the range of 2 ~ 10 mm, are oriented and provided so that the width (w) is within the range of 30 ~ 100 mm, and the above perforations 3 are perforated as they are oriented in a direction that is the same as the orientation direction 4 of the paper-like layer (porous synthetic paper) A1, which forms the above described supporting material layer A, where this paper-like layer is formed from a thermoplastic resin oriented (uniaxially oriented) film (A1), which contains the micro voids 2; and where on the front surface of the paper-like layer A1 that is on the surface side of the above supporting material layer (A) the pattern or lettering etc., printing (II), has been provided.

[0006]

[II] Laminated layer sheet (I)

- (1) Structure forming layer
- (2) Supporting material layer (A)
 - (a) Structure

As the supporting material layer (A) that is used in the signboard paper 1 according to the present invention a finely porous synthetic paper is used that allows the conducting of the printing (II) on the front surface and where there are numerous micro voids 2 contained in the inner part and there are micro voids on the surface and that is obtained from a oriented film formed from a thermoplastic resin containing fine inorganic powder material 5. As the above finely porous synthetic paper, for example, it is possible to list the shown here below materials (i) or (ro).

- (i) Biaxially oriented film formed from a thermoplastic resin containing a fine porosity and containing in the range of 8 ~ 45 weight % of fine inorganic powder or organic filler (reported in the descriptions of the Japanese Patent report Number Showa 54-31032, United States Patent number 3,775,521, United States Patent number 3,758,661, United States Patent number 3,844,865, United States Patent number 4,303,708).

(ro) Synthetic paper where the substrate material layer A2 is made to be biaxially oriented propylene type resin film containing fine inorganic powder or organic filler in an amount in the range of 5 ~ 80 weight %, and where a paper-like layer A1, which is formed from a uniaxially oriented film of propylene type resin containing in the range of 8 ~ 65 weight % of inorganic fine powder, is used (reported according to the descriptions of the Japanese Patent Report number Showa 46-40794, Japanese Patent Application Laid Open Number Showa 57-149363, Japanese Patent Application Laid Open Number Showa 57-181829, etc.).

[0007]

Regarding this type of synthetic paper, it is a good option if, as it is shown according to Figure 1, it is a dual layer structure formed as an uniaxially oriented film of paper-like layer A1 is present on the surface side of the biaxially oriented film substrate material layer A2, or it is a triple-layer structure (Japanese Patent Report Number Showa 46-40794) where an uniaxially oriented film of paper-like layer A1 is present on both the surface and the back side of the biaxially oriented film substrate material layer A2, and especially, it is a triple-layer ~ six-layer synthetic paper (reported according to the descriptions of the Japanese Patent Report Number Showa 50-29738, Japanese Patent Application Laid Open Number Showa 57-149363, Japanese Patent Application Laid Open Number Showa 56-126155, Japanese Patent Application Laid Open Number Showa 57-181829). Also, it is a good option if it is a synthetic paper with a triple- or more layer structure where the back surface contains a heat seal layer that is formed from ethylene – methyl acrylate copolymer, ethylene – (meth)acrylic acid copolymer metal salts (Na, Li, Zn, K), polyethylene chloride etc., resins that have a melting point that is lower than that of the resin of the substrate layer (Japanese Patent report Number Hei-Sei 3-13973). Also, especially, in order to improve the offset printability properties of the surface of this synthetic paper, it is also a good option if a coating layer is provided that improves the water soluble printability properties and that can be selected from the group of polyethylene imine, poly (ethylene imine – urea), ethylene imide adduct of polyamine polyamide, epichlorhydrine adduct of polyamine polyamide, tertiary ~ quarternary nitrogen atom containing acrylic acid type resin.

[0008]

As one example of a synthetic paper with a triple-layer structure there is the laminated layer sheet type structure material that is a film material obtained as on both surfaces of a uniaxially oriented film obtained as a film, which is formed from a thermoplastic resin containing in the range of 5 ~ 40 weight % of fine inorganic powder, is oriented at a temperature that is lower than the melting temperature of the above resin, in one direction (the longitudinal direction or the transverse direction) at a ratio in the range of 3 ~ 15 times, and preferably, in the range of 4 ~ 12 times, a film of molten thermoplastic resin containing fine inorganic powder material in an amount in the range of 8 ~ 65 weight %, is layer laminated, and then after that this laminated layer film is oriented in a direction that is orthogonal to the above described direction (the transverse or the longitudinal direction) at a ratio in the range of 3 ~ 10 times, and preferably, in the range of 4 ~ 7 times; where the paper-like layer A1 is a porous film containing a large number of fine pores and uniaxially oriented, and the substrate material layer A2 is biaxially oriented. Regarding the above described orientation method of the thermoplastic resin film, there is no problem if it is a material that has been oriented according to any of the following orientation methods: the orientation method using extension and orientation through 2 pairs of rolls with a differential in the rotational speed, the method where pressure is applied through the rolls and the film is oriented, the method where a tenter is used, or the method where a combination of the above methods is used. Naturally, it is also a good option if on this front surface also a primer (coating agent) layer is provided and the

offset printing properties are improved; and regarding the biaxially oriented film that is the substrate material layer A2 it imparts and contributes to the longitudinal and transverse direction strength balance of the synthetic paper, and also, the uniaxially oriented film used as the paper-like layer A1 brings a paper-like feel and together with that it strengthens the strength of the front surface.

[0009]

Among these synthetic paper materials, the synthetic paper that is a material that is a laminated layer film where a finely porous film, which is formed from a biaxially oriented film of a propylene type film containing in the range of 8 ~ 40 weight % of a fine inorganic powder material, is used as the substrate material layer A1, and where the front surface layer is formed from an uniaxially oriented material of a propylene resin type film containing in the range of 8 ~ 55 weight % of fine inorganic powder material where the average particle diameter is in the range of 0.05 ~ 3 microns, and that is a material where the above front surface layer that supports the conducting of the printing is a layer that satisfies the below described conditions (1) ~ (3), is a preferred material from the point of view of the thermal resistance properties, the economical efficiency, the water-proof properties, the anti-blocking properties.

- (1) The measured according to the JIS B0601 center surface average roughness (Sra) is within the range of 0.20 ~ 0.8 microns, the center surface peak height (SRp) is within the range of 3.0 ~ 8.5 microns, the center surface valley depth (SRv) is within the range of 2.0 ~ 4.0 microns.
- (2) The average surface smoothness (slipperiness) measured according to the regulations of the JIS P8119 (Beck number) is within the range of 400 ~ 1,200 seconds.
- (3) The surface strength in the longitudinal direction is within the range of 1 ~ 10 kg.cm.

[0010]

(b) Materials

Thermoplastic resin

As the thermoplastic resin used in the finely porous synthetic paper of the above described supporting material layer (A), melting point of 120°C or higher possessing, high density polyethylene (especially preferably, high density polyethylene where the density is within the range of 0.945 ~ 0.970 g/cm³, linear chain type polyethylene where the density is within the range of 0.890 ~ 0.940 g/cm³), propylene type resins, polyethylene terephthalate, polyamide, polycarbonate etc., can be used, however, from economic efficiency point of view the high-density polyethylene, the propylene type resins, and especially, the propylene type resins, are preferred. As such propylene type resins, propylene homopolymer material, propylene – ethylene copolymer material, propylene – butene-1 copolymer material, propylene – ethylene – butene-1 copolymer

material, propylene – 4-methyl pentene –1 copolymer material, propylene – 3-methyl-pentene –1 copolymer material, etc., can be used. It is a good option if these copolymers are random type copolymers or if they are block type copolymers.

Fine Inorganic Powder Material

As the fine inorganic powder material used for the finely porous synthetic paper of the above described supporting material layer (A), calcium carbonate, sintered clay, silicon seaweed dust, talcum, titanium oxide, barium sulfate, aluminum sulfate, silica, etc., materials with an average particle diameter that is within the range of 10 microns or less, preferably 4 microns or less, can be used as examples.

[0011]

© Thickness

Regarding the thickness of this supporting material layer (A) that is a finely porous synthetic paper material, because of the fact that it is used as a signboard paper material, usually, a material where the thickness is within the range of 40 ~ 500 microns, preferably, within the range of 80 ~ 300 microns, can be used. Also, in the case of a structure when the above described, fine inorganic powder material containing in the range of 5 ~ 40 weight %, biaxially oriented propylene type resin film (A2) is used as the substrate material layer, and also the fine inorganic powder containing in the range of 8 ~ 65 weight %, containing numerous micro voids in the inner part and containing micro voids on the surface, thermoplastic resin film (A1) is used as the paper-like layer, it is preferred that the layer lamination is conducted so that the thickness of the paper-like layer A1 comprises in the range of 10 ~ 60 % of the thickness of the total material, and preferably, in the range of 15 ~ 50 %, and that the thickness of the supporting material layer (A2) comprises in the range of 90 ~ 40 %, and preferably, in the range of 85 ~ 50 % of the total material thickness. Regarding the thickness of the paper-like layer that is formed from the above thermoplastic resin uniaxially oriented film (A1), in the case when it is less than 10 % of the thickness of the total material of the supporting material (A), sufficient break strength as a signboard paper material is not obtained, and there is the trend that the practical application feasibility properties are significantly reduced. Also, on the contrary, if that is higher than 60 %, sufficient break strength can be obtained, however, there is the trend that the toughness properties become poor.

[0012]

(c) Commercially available synthetic paper material

As the finely porous synthetic paper used as the above described supporting material layer (A), it is possible to use large size printing paper that allows for large size printing. As detailed examples of such synthetic paper used for large size printing, for example, the synthetic paper materials sold by Oji Yuka Synthetic Paper Company with the

product names “ Yupo, FPG, SEG, KPR, TPG, SGU, etc.”, can be used for chrysanthemum stamp, chrysanthemum 4 times stamp, 4/6 stamp, etc.

[0013]

(B) Pressure Sensitive Adhesive Agent Layer (B)

As the pressure sensitive adhesive agent layer (B) it is possible to use different types of pressure sensitive adhesive agents, however, the use of the shown here below pressure sensitive agents is preferred.

(a) Pressure sensitive adhesive agents

The important point about the pressure sensitive adhesive agents used according to the present invention is the fact that they are materials where the T type peel strength measured according to the procedures of the measurement method of the JIS Z-0237 is within the range of 10 ~ 200 g/25 mm width, and preferably within the range of 30 ~ 150 g/25 mm width, and especially preferably, within the range of 50 ~ 100 g/25 mm width. As the above described pressure sensitive adhesive agents it is possible to list the following materials: polyisobutylene rubber, butyl rubber, rubber type adhesive agents obtained as these mixed materials are dissolved in an organic solvent agent such as benzene, toluene, xylene, hexane, etc., or materials obtained as to these rubber type adhesive agents, api ethylene acid rosine ester, terpene – phenol copolymer, terpene – indene copolymer etc., adhesion imparting agents are compounded, or acrylic type adhesive agents where 2-ethyl hexyl acrylate – n-butyl acrylate copolymer material, 2-ethyl hexyl acrylate – ethyl acrylate – methyl methacrylate copolymer etc., acrylic type copolymers where the glass transition point is –20oC or lower, are dissolved in organic solvent, etc. As the coated amount of the above pressure sensitive adhesive agent, an amount that is within the range of 3 ~ 40 g/m², preferably, in the range of 10 ~ 30 g/m², as a solid phase, is used. Regarding the thickness of the pressure sensitive adhesive agent after the above described coating and drying, usually, in the case of an acrylic type adhesive agent, it is made to be within the range of 10 ~ 50 microns, and in the case of a rubber type adhesive agent, it is made to be within the range of 80 ~ 150 microns.

[0014]

(b) Anchor coating agent

Prior to the coating of the above described pressure sensitive adhesive agent, it is preferred that an anchor coating agent be coated. As the above described anchor coating agent it is possible to use polyurethane, polyisocyanate – polyether polyol, polyisocyanate – polyol, polyethylene imine, alkyl titanate, etc., and these are usually dissolved in methanol, water, ethyl acetate, toluene, hexane, etc., organic solvent agents, and then used. Regarding the coating amount of the anchor coating agent onto the supporting material layer, an amount, which after the coating and the drying, is within the

range of 0.01 ~ 5 g/m², preferably, in the range of 0.05 ~ 2 g/m², as a solid phase, is used.

[0015]

© Release paper layer ©

Regarding the release paper layer ©, it is a material where a release type properties possessing resin layer is formed on the back surface side of the release paper, and the above release type resin layer can be formed as silicone resin or polyethylene wax etc., release type resin is dissolved by using organic solvent etc., and after that this is coated directly onto the release type paper and dried. . Regarding the coating amount of the above release type resin layer, an amount, which after the coating and the drying, is within the range of 0.5 ~ 10 g/m², preferably, in the range of 1 ~ 8 g/m², as a solid phase, is used.

[0016]

(3) Perforation marks

On the above described supporting material layer (A)/pressure sensitive adhesive agent layer (B) part, as it is shown according to the presented in Figure 2, the perforation marks 3 with a diameter (d) that is within the range of 0.01 ~ 2 mm, and preferably, within the range of 0.04 ~ 1 mm, and with a pitch (t) that is within the range of 2 ~ 10 mm, and preferably, within the range of 2 ~ 4 mm, are perforated at a width (w) in the range of 50 ~ 200 mm, and preferably, within the range of 50 ~ 150 mm, and it is important that the above perforations 3 are arranged in a direction that is the same as the orientation direction of the above described supporting material layer (A) [the orientation (elongation) direction 4 of the paper-like layer that is formed from the thermoplastic resin uniaxially oriented film (A1) at the time of a laminated layer structure]. Regarding the diameter (t) (this is probably a typo in the original and should be (d) – translator's note) of the above described perforation marks 3, if it is smaller than the above described range, at the time of the gluing of the signboard paper, there is a generation of air entrapment in the space between the substrate board and the poster 3 and the escape of the above entrapped air becomes difficult. Also, if the above-described range is exceeded, it is easy for a breakage to be generated because of the perforations 3 and at the time of the gluing of the poster 1 it is difficult to extend the wrinkles, and it is easy to generate wrinkles. Regarding the pitch (t) of the openings of the above described perforation marks 3, if it is less than the above described range, at the time of the adhesion of the signboard paper it is easy to produce breaks caused by the perforation marks, and also, it becomes difficult to extend the wrinkles at the time of the gluing of the signboard paper. Also, if the above-described range is exceeded, it is easy to generate entrapped air at the time of the adhesion of the signboard paper. If the width (w) of the gap between the above described perforation marks 3 is less than the above described range, the separated signboard paper is broken into many pieces and it becomes difficult from the point of view of the garbage treatment process. Also, if the above described range is exceeded it

becomes easy for air to be entrapped in the space between the substrate board and the signboard paper at the time of the gluing of the signboard paper. If the direction 4 of the perforation of the above described perforation marks 3 is not arranged to be the same as the direction of the orientation (elongation) of the oriented film of the supporting material layer (A) the strip-shaped elongation and tearing becomes difficult.

[0017]

[III] Printing (II)

On the front surface of the paper-like layer a1 of the top most layer of the finely porous synthetic paper of the above described supporting material layer (A), especially, a pattern or lettering etc., printing (II) is applied. Regarding the printing, usually, it is possible to use relief plate printing, off set printing, gravure printing, screen-printing etc., different types of printing methods.

[0018]

[IV] Adhesion

Regarding the above described printed signboard paper material, it can be pasted onto the baseboards of erected signboards, or it is possible to adhere a number of connected items onto the sideboards of the tracks. In the case of the above described printed posters, the perforation marks 3 are perforated and provided at a certain (constant) distance and after that through the above perforation marks the air that is entrapped in the space between the supporting material layer (A)/pressure sensitive adhesive agent layer (B) and the surface of the baseboard is released (escapes), and it is possible to achieve gluing without producing indentations and protrusions (waviness) on the surface of the printed poster.

[0019]

[Practical Example]

The signboard paper according to the present invention is explained in further details through the shown here below practical implementation examples.

Practical Example 1

(1) Manufacturing of the supporting material layer

((1)) A composition material (A), which has been obtained as 3 weight % high density polyethylene and 16 weight % of calcium carbonate with an average particle diameter of 1.5 microns have been mixed into 81 weight % of polypropylene with a melt index (MI) of 0.8, was melted and kneaded by using an extruder that has been set at a temperature of 270°C, and after that through a die it was extruded in a sheet shape form, and this material was cooled by using a cooling device and the unoriented sheet material was

obtained. After that this unoriented sheet was again heated at a temperature of 140°C and after that it was oriented in the longitudinal direction at an orientation ratio of 5 times, and a film with an orientation ratio of 5 times, was obtained.

((2)) A composition material (B), which has been obtained as 54 weight % polypropylene with an MI of 4.0 and 46 weight % of calcium carbonate with an average particle diameter of 1.5 microns, were mixed, was melted and kneaded using another extruder and after that it was extruded into a sheet type form, and this material was layer laminated on both surfaces of the film with the orientation ratio of 5 obtained according to the above described (1), and a triple-layer structure possessing laminated layer film, was obtained. After that, this triple-layer structure possessing laminated layer film was cooled until a temperature of 60°C and after that it was again heated to a temperature of 160°C and by using a tenter it was oriented in the transverse direction at an orientation ratio of 7.5 times, and then an annealing treatment at a temperature of 165°C was conducted, and it was cooled to a temperature of 60°C, and the ear parts were slit and a triple layer structure (uniaxially oriented/biaxially oriented/uniaxially oriented) supporting material layer with a thickness of 80 microns (B/A/B = 16 microns/48 microns/16 microns), was obtained. Also, the void coefficient of each layer was B/A/B = 30 %/33.7 %/30 %.

[0020]

(2) Manufacturing of the laminated layer sheet (I)

On one of the surface sides of the paper-like layer uniaxially oriented films (A1) an acrylic type adhesive agent manufactured by Nippon Carbite Industries “Nikasol TS-1051 ML” (product name) was coated at a solids of 25 g/m², and a pressure sensitive adhesive agent layer (B) with a peel strength of 60 kg/25 mm, was formed, and especially, a release paper (10 g “Nonkal” (trade name) manufactured by Oji Chemical Industries Company, was layer laminated and the laminated layer sheet (I) comprised of the supporting material layer (A)/pressure sensitive adhesive agent layer (B)/release paper layer (C), was obtained.

[0021]

(3) Formation of the printed layer (II)

On the surface side of the micro void containing thermoplastic resin uniaxially oriented film (A1) of the supporting material layer (A) of this laminated layer sheet (I) an off set multicolor printing was conducted and the printed layer (II) was formed.

[0022]

(4) Formation of the perforation marks

On the above described laminated layer sheet (I) where the gravure printing has been conducted, perforation marks 3 with a diameter (d) of 1 mm, and a pitch (t) of 4 mm were

perforated along the same direction as the orientation (elongation) direction 4 of the paper-like layer that is comprised of the micro voids 2 containing, thermoplastic resin uniaxially oriented film (A1) of the supporting material layer (A), so that the width (w) of the spacing between adjacent marks is 100 mm, and it was cut into a size of chrysanthemum 4 stamps, and the signboard paper material was obtained.

[0023]

(5) Gluing (pasting)

The above described signboard paper was used and a gluing operation on the surface of a baseboard of an erected signboard that has been erected at the location inside the Oji Yuka Synthetic Paper company was conducted by personnel that had no special knowledge or technology and an erected signboard was obtained. In the case of the erected signboard using the above-described signboard paper there were no air entrapment or wrinkles and there were no protrusions or indentations (waviness) on the front surface, and a continuous gluing was achieved.

[0024]

(6) Removal (peeling)

The above-described erected signboard was left to stay for a period of 6 months and after that the peeling was conducted. Because of the fact that perforation marks had been formed in the signboard paper of the above signboard the release was easy and easy peeling at each perforation was possible. The adhesive strength of the pressure sensitive adhesive agent on the removed signboard paper was low and because of that it was possible to conduct a complete and continuous separation in a strip-shape form. Consequently, the operation of dissolving of the remaining adhesive agent layer using a solvent etc., was unnecessary and because of that the subsequent pasting of the new signboard paper, was easy.

[0025]

[Results from the Invention]

In the case of the signboard paper according to the present invention, at the time of the pasting onto the baseboard of erected signboards or the side boards of tracks etc., there is no generation of entrapped air and also, it is difficult to generate wrinkles and because of that for the gluing it is not required to have special knowledge or technology, and the gluing can be easily conducted by an amateur.

[Brief Explanation of the Figures]

[Figure 1]

Figure 1 is a diagram showing a sectional view of the signboard paper according to the practical example of the present invention.

[Figure 2]

Figure 2 is a top view diagram showing the signboard paper according to the practical example of the present invention.

[Explanation of the Symbols]

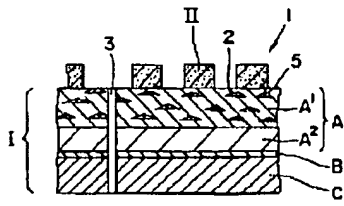
- 1.....signboard paper
- 2.....micro voids
- 3.....sawing machine marks (perforation marks)
- 4.....orientation direction
- 5.....fine inorganic powder material
- d.....diameter
- t.....pitch
- w.....width
- (I).....laminated layer sheet
- (II)printed layer
- (A).....supporting material layer
- (B)pressure sensitive adhesive agent layer
- ©.....release paper layer
- (A1)inner part numerous micro void containing, surface
micro void containing thermoplastic resin uniaxially oriented film, paper-like layer
- (A2) inner part micro void practically not containing,
thermoplastic resin biaxially oriented film, supporting material film

Patent Assignee: **Oji Yuka Synthetic Paper Co. Ltd.**

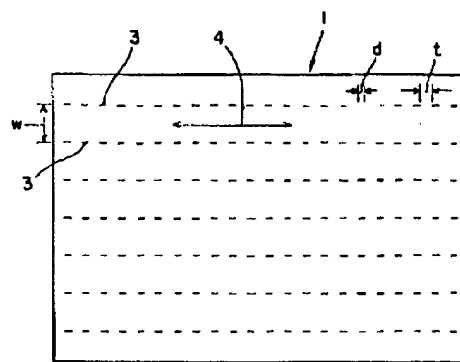
Translated by Albena Blagev ((651) 735-1461 (h), (651) 704-7946 (w))

10/06/04

【図1】



【図2】



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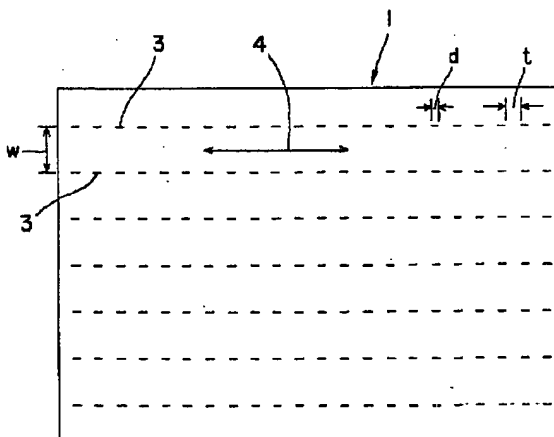
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(54) 【発明の名称】 看板用紙

(57) 【要約】

【目的】 素人でも空気溜まりや皺を生じさせないでポスターを貼ることができる看板用紙を提供する。

【構成】 支持体層(A) / 感圧粘着剤層(B) / 剥離紙層(C) の積層シート(I) より構成されて、該支持体層(A) の表面側に印刷が可能な看板用紙において、直径 (d) が0.01~2mm、ピッチ (t) が2~10mmのミシン目3が、幅 (w) 50~200mmの間隔で穿設されており、該ミシン目が前記支持体層(A) の延伸 (配向) 方向4と同一の方向に配列されており、かつ前記感圧粘着剤層(B) が剥離強度10~200g/25mm幅のものであることを特徴とする看板用紙。



【特許請求の範囲】

【請求項1】 延伸樹脂フィルムよりなる支持体層(A) / 感圧粘着剤層(B) / 剥離紙層(C) の積層シート(I) より構成されて、該支持体層(A) の表面側に印刷がなされた看板用紙であって、該看板用紙には直径(d)が0.01~2mm、ピッチ(t)が2~10mmのミシン目3が、幅(w)50~200mmの間隔で穿設されており、該ミシン目が前記支持体層(A) の配向方向4と同一の方向に配列されており、かつ前記感圧粘着剤層(B) が剥離強度10~200g/25mm幅のものであることを特徴とする看板用紙。

【請求項2】 支持体層(A) が、内部に微細な空洞を多数有し表面に微細な空孔を有する熱可塑性樹脂一軸延伸フィルム(A¹) からなる紙状層と、熱可塑性樹脂二軸延伸フィルム(A²) からなる基材層とが積層された構造であり、該熱可塑性樹脂二軸延伸フィルム(A²) からなる基材層の肉厚が支持体層(A) 全体の肉厚の10~60%の割合を占めたものであり、かつ、ミシン目が紙状層の延伸方向と同一方向に配列されたものである請求項1に記載の看板用紙。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、貼合わせ時においても空気溜まりが生じ難く、皺が生じ難いので、特殊な知識や技術が必要でなく、素人でも貼合わせを行なうことができる看板(ポスター)用紙である。

【0002】

【従来の技術】 従来、田園地帯の畑の中等に立てられている立看板の基板やトラックの側板に貼られているポスター(看板)は、大型のものであり、しかも、絵柄や文字が手書きのものよりも写真印刷されているものの方が商品に与えるイメージも良好であることから、裏面側に粘着層が形成されている大判(菊判、B倍判、菊4倍判、4/6判等)の印刷ポスターを多数枚繋いで貼り合わせたものが使用されている。

【0003】

【発明が解決しようとする課題】 しかし、この様な大判の印刷ポスターを、空気溜まりや皺が生じないように多数枚を連続して繋いで基板面上に貼り合わせることは容易なことではなく、貼り合わせに関する特殊な知識や技術が必要であり、素人が貼ることは困難なことであった。また、一定期間貼り出された印刷ポスターを剥がして、新たな印刷ポスターを貼り合わせる際には、前に貼った印刷ポスターを剥がす際に、綺麗に剥がさないと、基板面に残存した粘着剤層によって新たに貼られた印刷ポスターに凹凸が生じてしまう。従って、前に貼った印刷ポスターを基板面から完全に綺麗に剥がすか、剥がした後に残存した粘着剤層を溶剤で溶かすか、或いは、残存した粘着剤層と共に立看板の基板面を廃棄して、新たな基板面に取り替える必要があった。

【0004】

【課題を解決するための手段】

【発明の概要】 本発明者らは、上記問題点に鑑みて鋭意研究を重ねた結果、ポスター用紙にミシン目を特定の方向に、特定な大きさ、ピッチ及び間隔で穿設することによって、素人でも空気溜まりや皺が生じないでポスターを貼ることができるとの知見に基づき本発明を完成するに至ったものである。すなわち、本発明の看板用紙は、延伸樹脂フィルムよりなる支持体層(A) / 感圧粘着剤層(B) / 剥離紙層(C) の積層シート(I) より構成されて、該支持体層(A) の表面側に印刷がなされた看板用紙であって、該看板用紙には直径(d)が0.01~2mm、ピッチ(t)が2~10mmのミシン目3が、幅(w)50~200mmの間隔で穿設されており、該ミシン目が前記支持体層(A) の配向方向4と同一の方向に配列されており、かつ前記感圧粘着剤層(B) が剥離強度10~200g/25mm幅のものであることを特徴とするものである。

【0005】 【発明の具体的説明】

20 【I】 看板用紙

本発明の看板用紙1は、図1に示すように、例えば、微細空洞(マイクロポイド)2を含有する熱可塑性樹脂配向フィルム(微多孔性合成紙)よりなる支持体層(A) / 感圧粘着剤層(B) / 剥離紙層(C) の積層シート(I) から基本的に構成されており、該支持体層(A) / 感圧粘着剤層(B) の部分に、図2に示すように、直径(d)が0.01~2mmで、ピッチ(t)が2~10mmのミシン目3が、ミシン目3が配列している幅(w)が30~100mmの間隔で、該ミシン目3が前記支持体層(A) の微細空洞2を含有する熱可塑性樹脂配向(一軸延伸)フィルム(A¹) からなる紙状層(微多孔性合成紙) A¹ の配向方向4と同一の方向に配列して穿設されており、該支持体層(A) 側の表面の紙状層A¹ の表面上には、表面に絵柄や文字等の印刷(II)がなされたものである。

【0006】 【II】 積層シート(I)

(I) 構成層

(A) 支持体層(A)

(a) 構造

本発明の看板用紙1において用いられる支持体層(A)としては、表面に印刷(II)を施すことができる無機微細粉末5を含有する熱可塑性樹脂延伸フィルムよりなる内部に微細空洞2を多数有し表面に微細な空孔を有する微多孔性合成紙である。該微多孔性合成紙としては、例えば、以下に示す(イ)又は(ロ)のものを挙げることができる。

(イ) 無機微細粉末又は有機フィラーを8~45重量%の割合で含有する微多孔を有する熱可塑性樹脂の二軸延伸フィルム(特公昭54-31032号公報、米国特許第3,775,521号明細書、米国特許第3,758,661号明細書、米国特許第3,844,865号

明細書、米国特許第4,303,708号明細書)。

(ロ) 無機微細粉末又は有機フィラーを5~80重量%の割合で含有する二軸延伸プロピレン系樹脂フィルムを基材層A²とし、無機微細粉末を8~65重量%の割合で含有するプロピレン系の一軸延伸フィルム紙状層A¹とする合成紙(特公昭46-40794号公報、特開昭57-149363号公報、特開昭57-181829号公報等参照)。

【0007】この様な合成紙は、図1に示す様な、二軸延伸フィルムの基材層A²の表面側に一軸延伸フィルムの紙状層A¹が存在する二層構造であっても、或いは、二軸延伸フィルムの基材層A²の表裏面に一軸延伸フィルムの紙状層A¹が存在する三層構造(特公昭46-40794号公報)であっても、更に、紙状層A¹と基材層A²との間に他の樹脂フィルムが存在する三層~七層の合成紙(特公昭50-29738号公報、特開昭57-149363号公報、特開昭56-126155号公報、特開昭57-181829号公報)であっても良い。また、裏面にエチレン・アクリル酸メチル共重合体、エチレン・(メタ)アクリル酸共重合体の金属塩(Na、Li、Zn、K)、塩素化ポリエチレン等の基材層樹脂よりも低融点の樹脂よりなるヒートシール層を有する三層以上の合成紙であっても良い(特公平3-13973号公報)。また、この合成紙の表面に更にオフセット印刷性を向上させるために、ポリエチレンイミン、ポリ(エチレンイミン-尿素)、ポリアミンポリアミドのエチレンイミド付加物、ポリアミンポリアミドのエピクロルヒドリン付加物、三級乃至四級窒素含有アクリル酸系樹脂からなる群から選ばれた水溶性の印刷性を改善する塗布層を設けても良い。

【0008】三層構造の合成紙の一例は、無機微細粉末を5~40重量%の割合で含有する熱可塑性樹脂フィルムを、該樹脂の融点より低い温度で一方向(縦方向又は横方向)に3~15倍、好ましくは4~12倍に延伸して得られる一軸方向に配向したフィルムの両面に、無機微細粉末を8~65重量%の割合で含有する熱可塑性樹脂の溶融フィルムを積層し、次いで、この積層フィルムを前記方向と直角方向(横方向又は縦方向)に3~10倍、好ましくは4~7倍延伸することにより得られる、紙状層A¹が一軸方向に配向した微細な空隙を多数有するフィルムであり、基材層A²が二軸方向に配向した積層シート状構造物である。該熱可塑性樹脂フィルムの延伸方法については、二対のロールの周速差により引張って延伸するもの、ロールによる圧延方法によるもの、テンターによるもの、又は、それらの組み合わせによる延伸のうちいずれの方法で延伸したものでも構わない。勿論、この表面にプライマー(塗布剤)の層を設けてオフセット印刷性をより向上させても良く、二軸延伸フィルムの基材層A²は合成紙の縦と横の強度バランスの付与に寄与し、また、紙状層A¹の一軸延伸フィルムは紙的

風合いを呈すると共に表面強度を強くしている。

【0009】これら合成紙の中でも、無機微細粉末を8~40重量%の割合で含有するプロピレン系フィルムの二軸延伸フィルムよりなる微多孔性フィルムを基材層A²とし、平均粒径が0.05~3μmの無機微細粉末を8~55重量%の割合で含有するプロピレン系樹脂フィルムの一軸延伸物からなる表面層とする空孔率が5~35%の積層フィルムであって、印刷が施される該表面層が、次の①~③の条件を満足するものである合成紙が耐熱性、経済性、防水性、抗ブロッキング性の面から好ましい。

① JIS B0601で測定した中心面平均粗さ(SRa)が0.20~0.8μm、中心面山高さ(SRp)が3.0~8.5μm、中心面谷深さ(SRv)が2.0~4.0μmの粗さである。

② JIS P8119で測定される表面平滑度(ベック指数)が400~1,200秒である。

③ 縦方向の表面強度が1~10kg・cmである。

【0010】(b) 素 材

熱可塑性樹脂

前記支持体層(A)の微多孔性合成紙に用いられる熱可塑性樹脂としては、融点が120℃以上である高密度ポリエチレン(特に好ましくは密度が0.945~0.970g/cm³の高密度ポリエチレン、密度が0.890~0.940g/cm³の直鎖線状ポリエチレン)、プロピレン系樹脂、ポリエチレンテレフタレート、ポリアミド、ポリカーボネート等を挙げることができるが、経済性の面から高密度ポリエチレン、プロピレン系樹脂、特にプロピレン系樹脂が好ましい。かかるプロピレン系樹脂としては、プロピレン単独重合体、プロピレン・エチレン共重合体、プロピレン・ブテン-1共重合体、プロピレン・エチレン・ブテン-1共重合体、プロピレン・4-メチルペンテン-1共重合体、プロピレン・3-メチルペンテン-1共重合体等を挙げることができる。これら共重合体はランダム共重合体であっても、ブロック共重合体であっても良い。

無機微細粉末

前記支持体層(A)の微多孔性合成紙に用いられる無機微細粉末としては、炭酸カルシウム、焼成クレイ、珪藻土、タルク、酸化チタン、硫酸バリウム、硫酸アルミニウム、シリカなどの平均粒径が10μm以下、好ましくは4μm以下のものを例示することができる。

【0011】(c) 肉 厚

この微多孔性合成紙である支持体層(A)肉厚は、看板用紙として使用されるため、一般に40~500μm、好ましくは80~300μmのものが使用される。また、上記無機微細粉末を5~40重量%の割合で含有する二軸延伸プロピレン系樹脂フィルム(A²)を基材層とし、また、無機微細粉末を8~65重量%の割合で含有させて、内部に微細な空洞を多数有し表面に微細な空孔を有

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する熱可塑性樹脂フィルム(A¹)を紙状層として構成する場合には、紙状層A¹の肉厚が、支持体層(A)全体の肉厚の10~60%、好ましくは15~50%の割合を占めるものとし、支持体層(A²)は全体の肉厚の90~40%、好ましくは85~50%の割合を占める程度の厚さで積層されていることが好ましい。該熱可塑性樹脂一軸延伸フィルム(A¹)よりなる紙状層の肉厚が、支持体(A)の全体の10%未満では、看板用紙として十分な引裂強度が得られなく、実用性が著しく低下する傾向がある。また、逆に60%以上の値であれば、十分な引裂強度は得られるが、剛性が劣るようになる傾向がある。

【0012】(d) 市販合成紙

上記支持体層(A)として用いられる微多孔性合成紙としては、大型の印刷が可能な大判の印刷紙が用いられる。この様な大判の印刷用合成紙の具体例としては、例えば、王子油化合成紙株式会社より合成紙「ユボ FPG、SEG、KPR、TPG、SGU」等の商品名で市販されている四六判、菊判、菊四倍判のサイズのものを使用することができる。

【0013】(B) 感圧粘着剤層(B)

感圧粘着剤層(B)としては、各種の感圧粘着剤を使用することもできるが、以下に示す感圧性粘着剤を用いることが好ましい。

(a) 感圧性粘着剤

本発明における感圧性粘着剤として重要なことは、感圧粘着剤層(B)として用いられる感圧性粘着剤のJIS Z-0237により測定法におけるT型剥離強度が10~200g/25mm幅、好ましくは30~150g/25mm幅、特に好ましくは50~100g/25mm幅のものであることである。上記感圧性粘着剤としては、ポリイソブチレンゴム、ブチルゴム、これらの混合物をベンゼン、トルエン、キシレン、ヘキサンのような有機溶剤に溶解したゴム系粘着剤、或いは、これらゴム系粘着剤にアビエチレン酸ロジンエステル、テルペン・フェノール共重合体、テルペン・インデン共重合体などの粘着付与剤を配合したもの、或いは、2-エチルヘキシルアクリレート・アクリル酸n-ブチル共重合体、2-エチルヘキシルアクリレート・アクリル酸エチル・メタクリル酸メチル共重合体などのガラス転移点が-20℃以下のアクリル系共重合体を有機溶剤で溶解したアクリル系粘着剤などを挙げることができる。該感圧性粘着剤の塗工量としては、固形分量で3~40g/m²、好ましくは10~30g/m²である。上記塗工・乾燥後の感圧性粘着剤の肉厚は、アクリル系粘着剤の場合で10~50μm、ゴム系粘着剤の場合で80~150μmとするのが一般的である。

【0014】(b) アンカーコート剤

上記感圧性粘着剤を塗工する前に、アンカーコート剤を塗布することが好ましい。該アンカーコート剤としては、ポリウレタン、ポリイソシアネート・ポリエーテル

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ポリオール、ポリイソシアネート・ポリオール、ポリエチレンイミン、アルキルチタネートなどが使用でき、これらは一般に、メタノール、水、酢酸エチル、トルエン、ヘキサンなどの有機溶剤に溶解して使用される。支持体層へのアンカーコート剤の塗布量は、塗布・乾燥後の固形分量で0.01~5g/m²、好ましくは0.05~2g/m²である。

【0015】(C) 剥離紙層(C)

剥離紙層(C)は、剥離用紙の裏面側に離型性樹脂層を形成したものであり、該離型性樹脂層はシリコン樹脂やポリエチレンワックスなどの離型性樹脂を有機溶剤等によって溶解した後、これを剥離用紙に直接塗布・乾燥することによって形成することができる。該離型性樹脂層の塗布量は、塗布・乾燥後の固形分量で0.5~10g/m²、好ましくは1~8g/m²である。

【0016】(2) ミシン目

前記支持体層(A)/感圧粘着剤層(B)部分には、図2に示すように、直径(d)が0.01~2mm、好ましくは0.04~1mm、ピッチ(t)が2~10mm、好ましくは2~4mmのミシン目3が、幅(w)50~200mm、好ましくは50~150mmの間隔で穿設されており、該ミシン目3が前記支持体層(A)の延伸方向〔積層構造の時は熱可塑性樹脂一軸延伸フィルム(A¹)からなる紙状層の配向(延伸)方向4〕と同一の方向に配列されていることが重要である。上記ミシン目3の径(t)が、上記範囲未満であると看板用紙の貼合わせ時に基板とポスター3との間に空気溜まりが生じても、該空気溜まりより空気を排出することが困難となる。また、上記範囲を超えるとミシン目3より破れ易く、ポスター1の貼着時に皺を延ばすことができ難く、皺が生じ易い。上記ミシン目3の孔のピッチ(t)が、上記範囲未満であると看板用紙貼着時に該看板用紙がミシン目より破れ易いし、また、看板用紙の貼り合わせ時に皺を延ばすことができ難くなる。また、上記範囲を超えると看板用紙の貼着時に空気溜まりが生じ易い。上記ミシン目3の幅(w)の間隔が、上記範囲未満であると剥がされる看板用紙の切片が多くなり、ごみ処理が面倒となる。また、上記範囲を超えると看板用紙の貼着時に基板と看板用紙との間に空気溜まりが生じ易くなる。上記ミシン目3が穿設される方向4が支持体層(A)の延伸フィルムの配向(延伸)方向4と同一の方向に配列されていないと、ストリップ状の引き裂きが困難となる。

【0017】[III] 印刷(II)

前記支持体層(A)の微多孔性合成紙の最上層の紙状層a¹の表面には、更に絵柄や文字等の印刷(II)が施される。印刷は、一般に、凸版印刷、オフセット印刷、グラビア印刷、スクリーン印刷等の各種印刷方法を採用することができる。

【0018】[IV] 貼着

上記印刷された看板用紙は、立看板の基板やトラックの

側板に多数枚繋いで貼り合わせることができる。上記印刷されたポスターは、ミシン目3が一定間隔で穿設されていることから、該ミシン目より支持体層(A)／感圧粘着剤層(B)と基板面との間に生じた空気溜まりより空気を排出して、印刷されたポスターの表面に凹凸を作ることなく貼り合わせることができる。

【0019】

【実施例】本発明の看板用紙について、以下にその実施例を挙げて具体的に説明する。

実施例1

(1) 支持体層の製造

① メルトインデックス(MI)0.8のポリプロピレン81重量%に、高密度ポリエチレン3重量%及び平均粒径1.5 μ mの炭酸カルシウム16重量%を混合した組成物(A)を、270℃の温度に設定した押出機にて熔融混練させた後、ダイによりシート状に押し出し、これを冷却装置により冷却して無延伸シートを得た。次いで、この無延伸シートを140℃の温度に再度加熱した後、縦方向に5倍延伸して、5倍延伸フィルムを得た。

② MIが4.0のポリプロピレン54重量%と、平均粒径1.5 μ mの炭酸カルシウム46重量%を混合した組成物(B)を、別の押出機にて熔融混練させた後、ダイによりシート状に押し出し、これを上記(1)の5倍延伸フィルムの両面に積層し、三層構造の積層フィルムを得た。次いで、この三層構造の積層フィルムを60℃の温度にまで冷却した後、再び、160℃の温度にまで加熱して、テンターを用いて横方向に7.5倍延伸し、165℃の温度でアニーリング処理して、60℃の温度にまで冷却し、耳部をスリットして三層構造(一軸延伸／二軸延伸／一軸延伸)の肉厚80 μ m(B/A/B=16 μ m/48 μ m/16 μ m)の支持体層を得た。また、各層のボイド率はB/A/B=30%/33.7%/30%であった。

【0020】(2) 積層シート(I)の製造

該支持体層(A)の一方の紙状層の一軸延伸フィルム(A¹)面側に、日本カーバイド工業(株)製のアクリル系粘着剤「ニカゾール TS-1051 ML」(商品名)を固形分量で25g/m²塗工し、剥離強度が60kg/25mm幅の感圧粘着剤層(B)を形成し、更に、王子化工(株)製剥離紙(10g「ノンカール」(商品名))を積層して、支持体層(A)／感圧粘着剤層(B)／剥離紙層(C)よりなる積層シート(I)を得た。

【0021】(3) 印刷層(II)の形成

この積層シート(I)の支持体層(A)の微細空洞含有熱可塑性樹脂一軸延伸フィルム(A¹)面側にオフセット多色印刷を施して印刷層(II)を形成した。

【0022】(4) ミシン目の形成

上記グラビア印刷を施した積層シート(I)に、直径(d)が1mm、ピッチ(t)が4mmのミシン目3を、隣接するミシン目3との幅(w)が100mmの間

隔で、支持体層(A)の微細空洞2を含有する熱可塑性樹脂一軸延伸フィルム(A¹)からなる紙状層の延伸(配向)方向4と同一の方向に穿設し、菊4判の大きさに切断して、看板用紙を得た。

【0023】(5) 貼着

上記看板用紙を、王子油化合成紙(株)の工場の中に立てられた立看板の基板面上に、特殊な知識や技術の無い作業員にて貼り合わせ作業を行なって立看板を形成させた。上記看板用紙の貼られた立看板は、空気溜まりや皺が無く、表面に凹凸の無い、綺麗に貼り合わせられたものであった。

【0024】(6) 剥離

上記立看板を6ヶ月間放置した後、剥離を行なった。該看板の看板用紙にはミシン目が形成されているので、剥離が容易で、ミシン目毎に容易に剥離することができた。剥離される看板用紙には感圧粘着剤の粘着強度が低いので、綺麗に完全にストリップ状に剥離することができた。従って、残存する粘着剤層を溶剤で溶かす等の作業が不要なので、次の新しい看板用紙を貼るのが容易であった。

【0025】

【発明の効果】本発明の看板用紙は、立看板の基板やトラックの側板等に貼り合わせる際に、空気溜まりが生じ難く、かつ、皺が生じ難いので、貼り合わせに特殊な知識や技術が必要でなく、素人でも容易に貼合わせを行うことができる。

【図面の簡単な説明】

【図1】本発明実施例の看板用紙の断面図を示すものである。

【図2】本発明実施例の看板用紙の平面図を示すものである。

【符号の説明】

- 1 看板用紙
- 2 微細空洞(マイクロボイド)
- 3 ミシン目
- 4 配向方向
- 5 無機微細粉末
- d 直径
- t ピッチ
- w 幅

(I) 積層シート

(II) 印刷層

(A) 支持体層

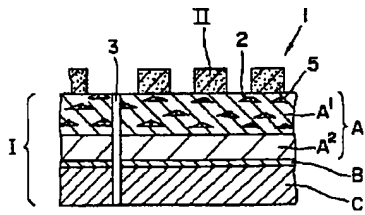
(B) 感圧粘着剤層

(C) 剥離紙層

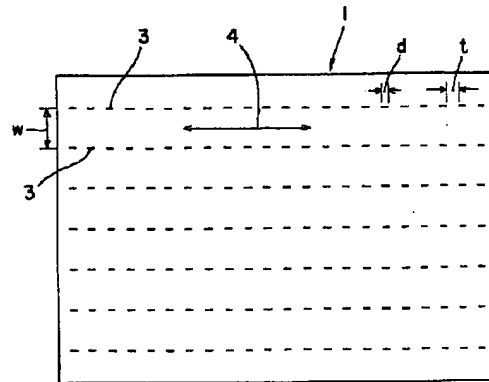
(A¹) 内部に微細な空洞を多数有し表面に微細な空孔を有する熱可塑性樹脂一軸延伸フィルム紙状層

(A²) 微細空洞を実質的に有しない熱可塑性樹脂二軸延伸フィルム基材層

【図1】



【図2】



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